

WHAT IS CLAIMED IS:

- 1 1. *A method for controlling a stand-by braking torque applied*
2 *to an automotive vehicle under a condition of approaching or*
3 *following an obstacle preceding the vehicle, the method*
4 *comprising:*
5 *determining a brake signal for brake pressure to apply a*
6 *brake torque, as a stand-by braking torque;*
7 *establishing at least one brake torque threshold;*
8 *monitoring the brake torque;*
9 *comparing the monitored brake torque with the*
10 *established brake torque threshold; and*
11 *modifying the brake signal in response to the comparing*
12 *the monitored brake torque with the established brake torque*
13 *threshold.*
- 1 2. *A method as claimed in claim 1, wherein a braking system*
2 *is employed, which uses hydraulic brake fluid as working*
3 *medium, wherein the step of monitoring the brake torque*
4 *includes:*
5 *detecting pressure of the hydraulic brake fluid at a first*
6 *location within the braking system to generate a first output*
7 *signal indicative of the detected pressure at the first location;*
8 *detecting pressure of the hydraulic brake fluid at a second*
9 *location within the braking system to generate a second output*
10 *signal indicative of the detected pressure at the second location;*
11 *and*
12 *processing the first and second output signals to provide*
13 *at least one variable expressing one of characteristics of the*
14 *brake torque.*
- 1 3. *A system for controlling a stand-by braking torque*

2 *applied to an automotive vehicle under a condition of*
3 *approaching or following an obstacle preceding the vehicle, the*
4 *system comprising:*

5 *an obstacle detection system for detecting a distance*
6 *between the vehicle and the obstacle preceding the vehicle;*

7 *a braking system for application, as a stand-by braking*
8 *torque, brake torque to the vehicle in response to a brake signal;*
9 *and*

10 *a controller for determining whether or not an operator*
11 *braking action to reduce the speed of the vehicle is imminent*
12 *under a condition of approaching or following an obstacle*
13 *preceding the vehicle based on the detected distance by the*
14 *detection system and a vehicle speed of the vehicle, determining*
15 *an initial value of brake torque, determining the brake signal for*
16 *the determined initial value of brake torque, applying the*
17 *determined brake signal to the braking system upon*
18 *determination that the operator braking action is imminent,*
19 *monitoring the brake torque applied to the vehicle, and*
20 *modifying the brake signal based on the monitored brake torque*
21 *after determination that the operator braking action is*
22 *imminent.*

1 4. *A system as claimed in claim 3, wherein the controller*
2 *determines a variable expressing instantaneous magnitude of*
3 *the brake torque, compares the determined variable with a*
4 *predetermined brake torque threshold, and effects operations to*
5 *modify the brake signal when the determined variable satisfies a*
6 *predetermined relationship with the predetermined brake*
7 *torque threshold.*

1 5. *A system as claimed in claim 4, wherein the controller*
2 *calculates a period of time during which the determined variable*
3 *stays greater than or equal to the predetermined brake torque*

4 *threshold, and reduces the brake signal to lower the brake*
5 *torque when the calculated period of time is equal to or greater*
6 *than a predetermined period of time.*

1 6. *A system as claimed in claim 4, wherein the controller*
2 *calculates a period of time during which the determined variable*
3 *stays greater than or equal to the predetermined brake torque*
4 *threshold, and adjusts the brake signal to reduce the brake*
5 *torque in response to the calculated period of time.*

1 7. *A system as claimed in claim 3, wherein the controller*
2 *determines a variable expressing instantaneous magnitude of*
3 *the brake torque, compares the determined variable with a*
4 *predetermined brake torque threshold, and effects operations to*
5 *modify the brake signal when the determined variable satisfies a*
6 *predetermined relationship with the predetermined brake*
7 *torque threshold.*

1 8. *A system as claimed in claim 7, wherein the controller*
2 *calculates period of time during which the determined variable*
3 *stays less than or equal to the predetermined brake torque*
4 *threshold, and increases the brake signal to increase the brake*
5 *torque when the calculated period of time is equal to or greater*
6 *than a predetermined period of time.*

1 9. *A system as claimed in claim 7, wherein the controller*
2 *calculates period of time during which the determined variable*
3 *stays less than or equal to the predetermined brake torque*
4 *threshold, and adjusts the brake signal to increase the brake*
5 *torque in response to the calculated period of time.*

1 10. *A system as claimed in claim 3, wherein the controller*
2 *determines a variable expressing time rate of change of*

3 *magnitude of the brake torque, compares the determined*
4 *variable with a predetermined brake torque threshold, and*
5 *reduces the brake signal to reduce the brake torque when the*
6 *determined variable is greater than or equal to the*
7 *predetermined brake torque threshold.*

1 *11. A system as claimed in claim 3, wherein the controller*
2 *determines a variable expressing time rate of change of*
3 *magnitude of the brake torque, compares the determined*
4 *variable with a predetermined brake torque threshold, and*
5 *increases the brake signal to increase the brake torque when the*
6 *determined variable is less than or equal to the predetermined*
7 *brake torque threshold.*

1 *12. A system as claimed in claim 3,*
2 *wherein the controller determines a first variable*
3 *expressing instantaneous magnitude of the brake torque,*
4 *compares the determined first variable with a predetermined*
5 *first brake torque threshold, and calculates a first period of time*
6 *during which the determined first variable stays greater than or*
7 *equal to the first predetermined brake torque threshold;*

8 *wherein the controller determines a second variable*
9 *expressing instantaneous magnitude of the brake torque,*
10 *compares the determined second variable with a predetermined*
11 *second brake torque threshold, and calculates a second period*
12 *of time during which the determined second variable stays less*
13 *than or equal to the predetermined second brake torque*
14 *threshold; and*

15 *wherein the controller subtracts the calculated second*
16 *period of time from the calculated first period of time to give a*
17 *difference, and adjusts the brake signal in response to the*
18 *difference.*

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13. A system as claimed in claim 6, wherein the controller
adjusts the brake signal such that the longer the calculated
period of time, the less the brake torque is.

14. A system as claimed in claim 9, wherein the controller
adjusts the brake signal such that the longer the calculated
period of time, the greater the brake torque is.

1 15. A system as claimed in claim 12, wherein the controller
2 adjusts the brake signal such that, in the event the difference is
3 positive, the greater the difference, the less the brake torque is,
4 while, in the event the difference is negative, the less the
5 difference, the greater the brake torque is.

1 16. A system as claimed in claim 13, wherein the braking
2 system employs hydraulic brake fluid as working medium, and a
3 first pressure sensor detects first pressure of the hydraulic brake
4 fluid of the braking system to generate a first output signal
5 indicative of the detected first pressure, and a second pressure
6 sensor detects second pressure of the hydraulic brake fluid of
7 the braking system to generate a second output signal.

17. A system as claimed in claim 16, wherein the controller determines a maximum and a minimum of the first and second output signals and uses one of the determined maximum and minimum as a variable expressing instantaneous magnitude of the brake torque.

18. A method for controlling a stand-by braking torque applied to an automotive vehicle under a condition of approaching or following an obstacle preceding the vehicle, the automotive vehicle having a braking system for application of brake torque, as a stand-by braking torque, to the vehicle in response to a

6 *brake signal, the method comprising:*

7 *detecting a distance between the vehicle and the obstacle*
8 *preceding the vehicle;*

9 *determining whether or not an operator braking action to*
10 *reduce the speed of the vehicle is imminent under a condition of*
11 *approaching or following an obstacle preceding the vehicle*
12 *based on the detected distance by the detection system and a*
13 *vehicle speed of the vehicle;*

14 *determining an initial value of brake torque;*

15 *determining the brake signal for the determined initial*
16 *value of brake torque;*

17 *applying the determined brake signal to the braking*
18 *system upon determination that the operator braking action is*
19 *imminent;*

20 *monitoring the brake torque applied to the vehicle; and*

21 *modifying the brake signal based on the monitored brake*
22 *torque after determination that the operator braking action is*
23 *imminent.*

1 *19. A system for controlling a stand-by braking torque applied*
2 *to an automotive vehicle under a condition of approaching or*
3 *following an obstacle preceding the vehicle, comprising:*

4 *means for applying brake torque, as a stand-by braking*
5 *torque, to the vehicle in response to a brake signal;*

6 *means for detecting a distance between the vehicle and*
7 *the obstacle preceding the vehicle;*

8 *controller means for determining whether or not an*
9 *operator braking action to reduce the speed of the vehicle is*
10 *imminent under a condition of approaching or following an*
11 *obstacle preceding the vehicle based on the detected distance*
12 *by the detection system and a vehicle speed of the vehicle,*
13 *determining an initial value of brake torque, determining the*
14 *brake signal for the determined initial value of brake torque,*

15 *applying the determined brake signal to the braking system*
16 *upon determination that the operator braking action is imminent,*
17 *monitoring the brake torque applied to the vehicle, and*
18 *modifying the brake signal based on the monitored brake torque*
19 *after determination that the operator braking action is*
20 *imminent.*

1 20. *An automotive vehicle comprising:*
2 *a detection system for detecting a distance between the*
3 *vehicle and the obstacle preceding the vehicle;*
4 *a braking system for application of brake torque, as a*
5 *stand-by braking torque, to the vehicle in response to a brake*
6 *signal; and*
7 *a controller for determining whether or not an operator*
8 *braking action to reduce the speed of the vehicle is imminent*
9 *under a condition of approaching or following an obstacle*
10 *preceding the vehicle based on the detected distance by the*
11 *detection system and a vehicle speed of the vehicle, determining*
12 *an initial value of brake torque, determining the brake signal for*
13 *the determined initial value of brake torque, applying the*
14 *determined brake signal to the braking system upon*
15 *determination that the operator braking action is imminent,*
16 *monitoring the brake torque applied to the vehicle, and*
17 *modifying the brake signal based on the monitored brake torque*
18 *after determination that the operator braking action is*
19 *imminent.*